

WHAT IS CLAIMED IS:

1. An injection molding apparatus, comprising:
a manifold including,
a junction component having an axial bore with a first end
opening to an exterior surface of said manifold, and at least one radial bore in
fluid communication with the axial bore and having at least one opening to an
outer surface of said junction component, and
at least one pipe, wherein said at least one pipe has a first end
that engages said at least one opening of said radial bore; and
a nozzle defining a nozzle channel in fluid communication with said at
least one pipe,
wherein said junction component and said at least one pipe are fixed
within a block that defines said manifold and wherein said junction component
and said at least one pipe define a manifold channel for directing the flow of a
melt material through said manifold and into said nozzle.
2. The apparatus of claim 1, wherein said block is a cast block.
3. The apparatus of claim 1, wherein said at least one pipe has at least one
bend.
4. The apparatus of claim 1, wherein the at least one pipe of the manifold
further includes:

at least one radial pipe having a first end engaging said junction component, and

at least one nozzle pipe having a first end engaging a second end of said radial pipe.

5. The apparatus of claim 4, wherein one of said first end of said nozzle pipe or said second end of said radial pipe is telescopically slidable inside the other, whereby the distance between said junction component and said nozzle is adjustable prior to casting.

6. The apparatus of claim 1, wherein the manifold further includes:

at least one support pillar component fixed within said block, said support pillar component defining an axial bore and extending a height of said manifold; and

a valve pin extending and retracting through said manifold via said axial bore of said support pillar component and into said nozzle channel.

7. The apparatus of claim 6, wherein said valve pin is connected to an actuation unit disposed outside of said manifold.

8. The apparatus of claim 6, wherein said support pillar component is coupled to said at least one pipe.

9. The apparatus of claim 1, wherein said manifold further includes a heating element fixed within said block.
10. The manifold of claim 9, wherein said heating element comprises a copper wire.
11. The apparatus of claim 9, wherein said heating element is a coil surrounding a configuration of at least said junction component engaged with said at least one pipe.
12. The apparatus of claim 9, wherein said heating element is a coil wrapping at least one full time around said at least one pipe.
13. The apparatus of claim 9, wherein said manifold further includes a plurality of heating elements.
14. The apparatus of claim 1, wherein said manifold further includes:
 - at least one branching junction component having an axial bore with a first end engaging a second end of said at least one pipe and at least one radial bore in fluid communication with said axial bore with at least one opening to an outer surface of said branching junction component, and
 - at least one branching pipe, wherein said at least one branching pipe has a first end that engages said at least one opening of said radial bore of the branching junction component.

15. The apparatus of claim 14, wherein said junction component and said branching junction component support said at least one pipe and said at least one branching pipe before, during and after said manifold is cast.

16. The apparatus of claim 1, wherein said at least one pipe is made of stainless steel.

17. The apparatus of claim 1, wherein said block is made from a soft thermally conductive metal.

18. The apparatus of claim 17, wherein said block is made from a material selected from the group consisting of copper, copper alloys, bronze, brass, aluminum, aluminum alloys, steel, steel alloys and combinations thereof.

19. The apparatus of claim 6, wherein said junction component and said support pillar component are made from a tool steel with a high melting point.

20. The apparatus of claim 19, wherein at least one of said junction component and said support pillar component are made from H13 tool steel.

21. The apparatus of claim 1, wherein said junction component includes a plurality of radial bores defining a plurality of openings to the outer surface of said junction component and wherein said manifold further includes a plurality

of pipes, such that each of said plurality of pipes is fluidly connected to one of said plurality of openings.

22. The apparatus of claim 1, wherein said first end of said axial bore of said junction component is in fluid communication with a sprue bushing.

23. The apparatus of claim 1, wherein said junction component is a sprue bushing.

24. A manifold for an injection molding apparatus, comprising:
at least one pipe for channeling a melt through the manifold;
a junction component having a first opening to an outside surface of the manifold and at least one second opening to the outside surface of said junction component, wherein said at least one second opening is in fluid communication with said at least one pipe;
at least one support pillar component for supporting a valve pin; and
a heating means,
wherein said at least one pipe, said junction component, said support pillar component and said heating means are affixed in a block.

25. The manifold of claim 24, wherein said block is a cast block.

26. The manifold of claim 24, wherein said heating means is a wire element coiled at least one time around said junction component, said support pillar component, and said at least one pipe.

27. The manifold of claim 24, wherein said heating means is a wire element coiled around said at least one pipe.

28. The manifold of claim 24, wherein said at least one pipe has at least one bend.

29. The manifold of claim 24, wherein said at least one pipe comprises a radial pipe and a nozzle pipe, wherein one of said nozzle pipe or said radial pipe is slidably inserted into the other, such that an overall length of said at least one pipe is adjustable.

30. The manifold of claim 24, further comprising a plurality of pipes, wherein each of said plurality of pipes is in fluid communication with one of a plurality of openings in said junction component for channeling a melt through the manifold.

31. The manifold of claim 24, wherein said support pillar component is coupled with said at least one pipe.

32. A manifold assembly, comprising: a nozzle unit and the manifold of claim 24.